Trend Study 16C-2-02

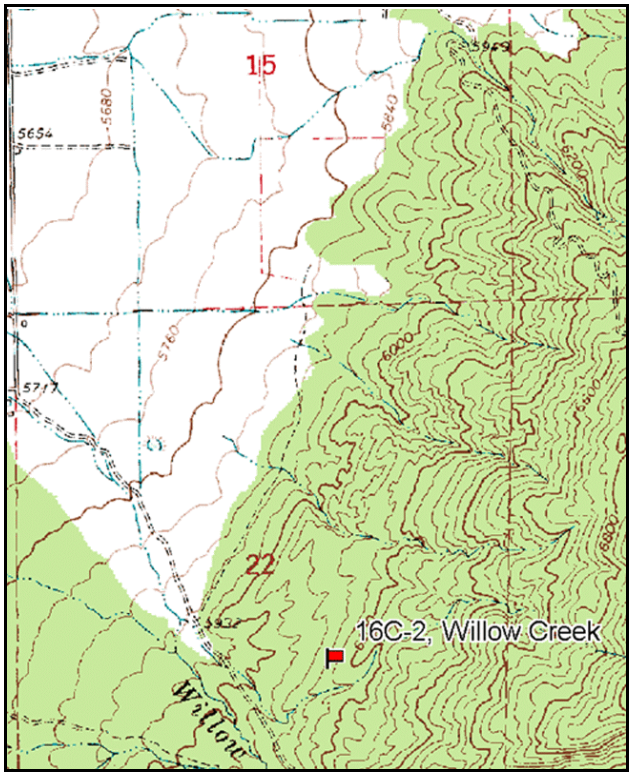
Study site name: Willow Creek . Vegetation type: Chained, Seeded P-J .

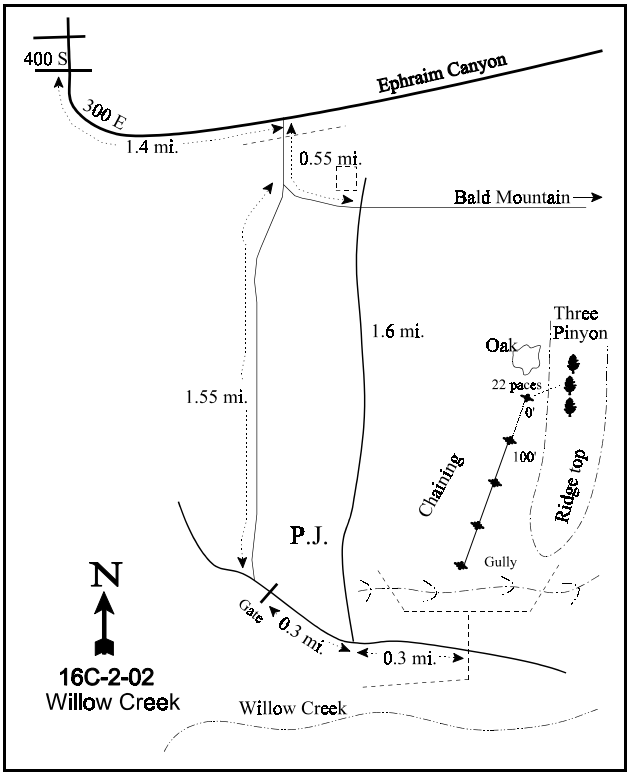
Compass bearing: frequency baseline 210 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 3 on 1 ft.

LOCATION DESCRIPTION

From the intersection of 400 South and 300 East in Ephraim, take 300 East south for 1.4 miles (making a 90° turn) to the Bald Mountain Road (look at map for alternate route). Take the Bald Mountain Road south and east for 0.55 miles to an intersection. Turn south and go 1.6 miles along the foothills to an intersection just north of Willow Creek. Turn left (east) and go 0.3 miles to a fence corner on the left side of the road. Park here. Cross the fence and the gully and go up the white shale ridge to the northeast (30-35 degrees magnetic). From the gully, go about 188 paces to a high point on the ridge where 3 large pinyons grow. Enroute you will pass the 400-foot stake which is near the ridge top. The 0-foot baseline stake, however, is 22 paces downhill from the 3 pinyons just south of an oak clump. The 0-foot stake is marked by browse tag #414. Consult diagrammatic sketch below for alternate route.





Map Name: Ephraim

Diagrammatic Sketch

Township 17S , Range 3E , Section 22

GPS: NAD 27, UTM 12S 4352135 N 451189 E

DISCUSSION

Willow Creek - Trend Study No. 16C-2

The Willow Creek study is located within a chaining on the lower slopes of Bald Mountain, southeast of Ephraim. The study site slopes to the west on a moderately steep slope (35%). Elevation is 6,150 feet. This transect lies inside the 700 acre Bald Mountain chaining and seeding treatment that was completed in 1969. This site was done to demonstrate that chaining could be done successfully on steep slopes. Sheep graze surrounding parcels of land and some trespass occurs on this piece of Division land, but overall, livestock use is light. There is abundant sign of wintering big game, especially deer. Deer pellets were sampled in over half of the quadrats in both 1997 and 2002. Pellet group transect data collected in 2002 estimated 174 deer days use/acre (430 ddu/ha) and 8 elk days use/acre (20 edu/ha). The amount of deer use on this site is one of the highest in the unit. Thermal cover is abundant around the site, and there is a better preferred browse component compared to most of the other chainings in the area.

Soils are a well-drained, shallow, shaley clay loam of the Atepic-Badland Association. The substratum is a layer of very strongly calcareous shaley silty clay loam. Runoff is usually rapid and the hazard from erosion is severe. It is classified as an Upland Shallow Shale (Juniper-Pinyon) range site. Moderately large patches of bare soil can be found on the surface, and rock-pavement cover is moderately high as well. Bare soil increased from 19% in 1997 to 32% in 2002. Rock and pavement combine for just over 21% of the soil surface in 2002. Litter is moderately low for a chaining at 33%. With drought in 2002, the ratio of protective ground cover to bare soil declined from 3:1 to 2.4:1. An erosion condition class assessment completed in 2002 determined it to be susceptible to slight erosion. Some gullying and sheet erosion are normal for this soil type.

Browse diversity on this study is higher than what is normally found on most chainings. Although the most numerous species are less desirable species such as broom snakeweed, low rabbitbrush, and pinyon-juniper, there are a significant number of valuable winter browse species. The most common preferred forage browse is bitterbrush, numbering an estimated 640 plants/acre in 2002. Age class of the bitterbrush population is composed mostly of mature plants, with reproduction from young plants being moderately low at 6% in 2002. Utilization has been moderate to heavy in all years, but vigor has been generally good. Decadency increased from 0% in 1997 to 16% in 2002. Leader growth on bitterbrush plants averaged just over 3 inches in 2002.

True mountain mahogany is the second most abundant preferred browse with an estimated density of 300 plants/acre in 2002, a decline from 420 plants/acre in 1997. The decline is the result in the loss of the young age class which numbered 100 plants/acre in 1997. As with bitterbrush, mahogany shows moderate to heavy use, normal vigor, and a slight increase in decadency (0% to 13%). Increased decadence and low reproduction are normal occurrences during periods of drought. Leader growth on mahogany averaged 1.8 inches in 2002. Less abundant palatable browse include mountain big sagebrush, white-stemmed rubber rabbitbrush, cliffrose, green ephedra, and serviceberry. Due to low densities and high deer use, most of these less abundant species displayed moderate to heavy use in 2002.

Scattered clumps of oakbrush and a moderate stand of pinyon-juniper occur throughout the area. Point-center quarter data estimated 109 juniper trees/acre and 69 pinyon trees/acre in 2002. Most of the trees are smaller as stem diameters average less than 3 inches for both species.

Grasses are abundant and diverse. Seeded species, especially the wheatgrass's and wildrye, dominate the understory. Sum of nested frequency for perennial grasses has slowly, but steadily decreased since the initial sample taken in 1989. The decline in 2002 is due in part to drought conditions. Cheatgrass is present on the site, but is being held in check by the abundance of competitive perennials. Forbs have been limited in all readings, but especially so in 2002 with drought. Bur buttercup was moderately abundant in 1997, but significantly declined in 2002. Alfalfa, which was seeded at the time of treatment, has remained on the site

although it is only occasionally sampled. The herbaceous component on this study looked considerably better than that on study 16C-1, Mayfield Mountain Face, during the drought year of 2002.

1989 APPARENT TREND ASSESSMENT

This chaining hardly looks 20 years old as release of juniper and pinyon has been slow. There is a vigorous, diverse stand of browse and also a fairly productive herbaceous understory. Overall, the site appears to have a stable trend with a desirable mix of vegetation. Considering the soil limitations of this site, the seeding was quite successful and a beneficial conversion from a predominately juniper community. However, the soil trend appears to be down due to continued erosion.

1997 TREND ASSESSMENT

The trend for soil is now improving with a noticeable decline in bare soil for the site. Litter cover declined in 1997, but 56% of the total vegetative cover comes from herbaceous species which are effective at protecting soils from high intensity summer storms. There is a good mixture of shrubs, although the preferred species contribute only about half of the total browse cover. The two most abundant preferred species are bitterbrush and true mountain mahogany, with both showing improving trends. The trend for the herbaceous understory is stable. Perennial grass sum of nested frequency has remained fairly stable. The abundance of bur buttercup, an allelopathic winter annual, is the most negative part of the herbaceous understory.

TREND ASSESSMENT
soil - slightly up (4)
browse - up (5)
herbaceous understory - stable (3)

2002 TREND ASSESSMENT

Trend for soil is slightly down. Percent bare soil increased to 32%, resulting in a decrease in the ratio of protective cover to bare soil. Erosion is not severe, but is ongoing as evidenced by pedestalling around bunchgrasses. Trend for browse is slightly down. Bitterbrush and true mountain mahogany have slightly increased decadence, low reproduction, and slightly declining densities. Utilization is heavy on both species as winter deer use is high on this site. Trend for the herbaceous understory is stable. Although the sum of nested frequency for perennial grasses declined by 9% overall, the most abundant species remained stable. Perennial forbs declined due to drought conditions, but they were infrequent prior to the 2002 reading. Composition remains dominated by perennial grasses.

TREND ASSESSMENT
soil - slightly down (2)
browse - slightly down (2)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 16C, Study no: 2

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
G	Agropyron cristatum	$_{b}$190	$_{a}$116	$_{a}$119	78	48	49	4.50	5.72
G	Agropyron intermedium	$_{b}$159	$_{ab}$122	$_{a}$87	60	46	35	2.95	1.27
G	Agropyron spicatum	20	32	35	7	15	15	2.37	2.14
G	Bromus inermis	8	9	4	4	4	2	.04	.16
G	Bromus tectorum (a)	-	$_{b}$92	$_{a}$12	-	31	4	1.39	.02
G	Elymus junceus	17	9	18	9	5	8	.90	1.17
G	Festuca ovina	$_{ab}$40	$_{a}$35	$_{b}$64	17	15	25	1.71	3.81
G	Oryzopsis hymenoides	$_{a}$6	$_{b}$37	$_{a}$12	3	17	4	.65	.25
G	Poa secunda	$_{a}$31	$_{b}$84	$_{b}$66	13	32	27	1.50	.84
G	Sitanion hystrix	-	2	-	-	1	-	.01	-
Total for Annual Grasses		0	92	12	0	31	4	1.39	0.01
Total for Perennial Grasses		471	446	405	191	183	165	14.66	15.40
Total for Grasses		471	538	417	191	214	169	16.05	15.42
F	Agoseris glauca	-	3	-	-	1	-	.03	-
F	Alyssum alyssoides (a)	-	$_{b}$118	$_{a}$1	-	49	1	.34	.00
F	Astragalus utahensis	$_{a}$-	$_{b}$13	$_{ab}$1	-	5	1	.34	.03
F	Balsamorhiza sagittata	-	5	-	-	3	-	.02	-
F	Camelina microcarpa (a)	-	6	-	-	2	-	.01	-
F	Chaenactis douglasii	-	8	-	-	4	-	.02	-
F	Cirsium spp.	1	-	-	1	-	-	-	-
F	Convolvulus arvensis	3	8	-	1	3	-	.06	.00
F	Cryptantha spp.	-	4	-	-	2	-	.18	-
F	Cymopterus spp.	-	2	-	-	1	-	.00	-
F	Descurainia pinnata (a)	-	4	-	-	2	-	.01	-
F	Machaeranthera canescens	-	4	-	-	2	-	.06	-
F	Medicago sativa	$_{b}$33	$_{a}$16	$_{a}$12	14	7	5	.78	.15
F	Microsteris gracilis (a)	-	9	-	-	4	-	.02	-
F	Petradoria pumila	-	1	-	-	1	-	.03	-
F	Phlox hoodii	4	9	6	2	3	2	.18	.15
F	Phlox longifolia	3	6	12	1	3	6	.01	.08
F	Ranunculus testiculatus (a)	-	$_{b}$183	$_{a}$23	-	65	8	1.70	.04
F	Tragopogon dubius	-	5	1	-	2	1	.06	.00
Total for Annual Forbs		0	320	24	0	122	9	2.08	0.04
Total for Perennial Forbs		44	84	32	19	37	15	1.79	0.42
Total for Forbs		44	404	56	19	159	24	3.88	0.46

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 16C, Study no: 2

Type	Species	Strip Frequency '97	Strip Frequency '02	Average Cover % '97	Average Cover % '02
B	Amelanchier utahensis	1	1	.03	.15
B	Artemisia tridentata vaseyana	3	2	.03	-
B	Cercocarpus montanus	18	14	.93	.54
B	Chrysothamnus nauseosus albicaulis	5	5	.81	.38
B	Chrysothamnus viscidiflorus stenophyllus	23	26	.76	1.10
B	Cowania mexicana stansburiana	1	1	-	-
B	Eriogonum microthecum	1	2	.03	.03
B	Gutierrezia sarothrae	9	12	.06	.21
B	Juniperus osteosperma	9	9	4.97	4.35
B	Opuntia spp.	4	2	.15	.03
B	Pinus edulis	5	7	1.99	3.33
B	Purshia tridentata	30	28	5.79	3.56
B	Quercus gambelii	1	1	.00	-
Total for Browse		110	110	15.58	13.71

CANOPY COVER -- LINE INTERCEPT
Herd unit 16C, Study no: 2

Species	Percent Cover '97	Percent Cover '02
Amelanchier utahensis	-	.17
Cercocarpus montanus	-	1.08
Chrysothamnus nauseosus hololeucus	-	.33
Chrysothamnus viscidiflorus	-	3.00
Eriogonum microthecum	-	.17
Gutierrezia sarothrae	-	.25
Juniperus osteosperma	3.8	6.92
Opuntia spp.	-	.05
Pinus edulis	.6	3.83
Purshia tridentata	-	3.67
Rhus trilobata	-	.50

Key Browse Annual Leader Growth
Herd unit 16C , Study no: 2

Species	Average leader growth (in) '02
Cercocarpus montanus	1.8
Purshia tridentata	3.1

Point-Quarter Tree Data
Herd unit 16C , Study no: 2

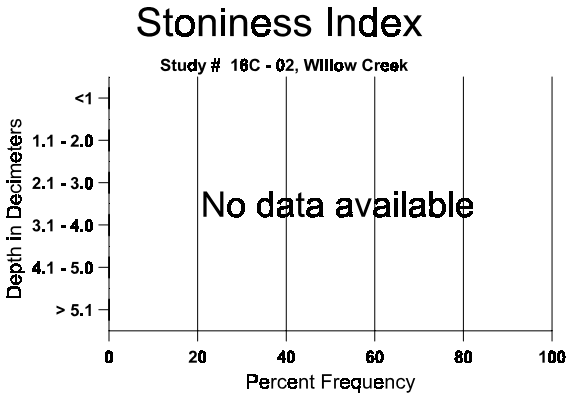
Species	Trees per Acre '02	Average diameter (in) '02
Juniperus osteosperma	109	2.5
Pinus edulis	69	2.7

BASIC COVER --
Herd unit 16C, Study no: 2

Cover Type	Nested Frequency		Average Cover %		
	'97	'02	'89	'97	'02
Vegetation	329	267	8.00	33.14	29.02
Rock	160	167	9.00	6.12	7.28
Pavement	234	266	8.00	10.93	14.11
Litter	370	375	47.25	33.43	33.65
Cryptogams	82	47	0	1.17	1.71
Bare Ground	254	283	27.75	19.32	32.48

SOIL ANALYSIS DATA --
Herd Unit 16C, Study no: 02, Willow Creek

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
14.9	59.0 (14.9)	7.4	48.0	25.4	26.6	7.4	9.2	150.4	.5



PELLET GROUP FREQUENCY --
Herd unit 16C, Study no: 2

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'97	'02	⁄02	⁄02
Rabbit	19	9	-	-
Elk	8	5	104	8 (20)
Deer	56	54	2262	174 (430)
Cattle	-	1	-	-

BROWSE CHARACTERISTICS --
Herd unit 16C, Study no: 2

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	17	0
	02	-	-	1	-	-	-	-	-	-	1	-	-	-	20	13	18	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	100%	00%	00%	+ 0%
'02	00%	100%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	-
	'97	20		-
	'02	20		-

Artemisia tridentata vaseyana																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	1	2	-	-	-	-	-	-	3	-	-	-	60	18	26	3
	02	-	-	-	-	-	1	-	-	-	1	-	-	-	20	15	21	1
D	89	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	1	-	-	-	1	-	-	-	20			1
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	- 9%
'97	33%	67%	00%	-33%
'02	00%	100%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	66	Dec:	100%
	'97	60		0%
	'02	40		50%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Atriplex canescens																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	22	19	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	18	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'89	00%	00%	00%
'97	00%	00%	00%
'02	00%	00%	00%

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	-
	'97	0		-
	'02	0		-

Cercocarpus montanus																		
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	4	-	-	1	-	-	-	-	-	5	-	-	-	100			5
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	-	-	3	-	-	-	-	1	-	4	-	-	-	133	8	9	4
	97	2	9	3	-	1	1	-	-	-	16	-	-	-	320	25	34	16
	02	-	-	4	-	-	8	-	-	1	13	-	-	-	260	24	31	13
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	2	-	-	-	2	-	-	-	40			2
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	75%	00%	+68%
'97	48%	19%	00%	-29%
'02	00%	100%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	133	Dec:	0%
	'97	420		0%
	'02	300		13%

Chrysothamnus nauseosus albicaulis																		
Y	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	89	2	1	-	-	-	-	-	-	-	3	-	-	-	100	22	24	3
	97	3	1	-	-	-	-	-	-	-	4	-	-	-	80	35	37	4
	02	2	-	-	-	-	-	-	-	-	2	-	-	-	40	31	32	2
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	1	-	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	25%	00%	00%	-25%
'97	20%	00%	00%	+ 0%
'02	00%	20%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	133	Dec:	0%
	'97	100		0%
	'02	100		40%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	9	-	-	-	-	-	-	-	-	9	-	-	-	300			9
	97	14	-	-	-	-	-	-	-	-	14	-	-	-	280			14
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	28	-	-	1	-	-	-	-	-	28	-	1	-	966	14	17	29
	97	40	-	-	-	-	-	-	-	-	40	-	-	-	800	15	20	40
	02	45	2	-	3	-	-	-	-	-	50	-	-	-	1000	12	19	50
D	89	4	-	-	-	-	-	-	-	-	3	-	-	1	133			4
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	3	2	-	-	-	-	-	-	-	4	-	-	1	100			5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	05%	-23%
'97	00%	00%	00%	+ 2%
'02	07%	00%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	1399	Dec:		10%
'97	1080			0%
'02	1100			9%

Cowania mexicana stansburiana

M	89	-	1	-	-	-	-	-	-	-	1	-	-	-	33	13	14	1
	97	-	2	-	-	-	-	-	-	-	2	-	-	-	40	24	18	2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	33	0
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	1	-	-	-	-	-	-	1	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	100%	00%	00%	+18%
'97	100%	00%	00%	-50%
'02	00%	100%	100%	

Total Plants/Acre (excluding Dead & Seedlings)			
'89	33	Dec:	0%
'97	40		0%
'02	20		100%

Ephedra viridis

M	89	-	1	-	-	-	-	-	-	-	1	-	-	-	33	17	15	1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	21	40	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	13	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	100%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'89	33	Dec:	-
'97	0		-
'02	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Eriogonum microthecum																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	7	1
	02	1	-	-	-	-	1	-	-	-	2	-	-	-	40	6	14	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	+50%
'02	00%	50%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	-
	'97	20		-
	'02	40		-

Gutierrezia sarothrae																		
Y	89	8	-	-	-	-	-	-	-	-	8	-	-	-	266			8
	97	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	34	-	-	-	-	-	-	-	-	34	-	-	-	1133	9	11	34
	97	25	-	-	-	-	-	-	-	-	25	-	-	-	500	11	13	25
	02	35	-	-	-	-	-	-	-	-	35	-	-	-	700	7	9	35
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	-51%
'97	00%	00%	03%	+ 3%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	1399	Dec:	0%
	'97	680		3%
	'02	700		0%

Juniperus osteosperma																		
Y	89	5	-	-	-	-	-	-	-	-	5	-	-	-	166			5
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	02	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33	33	59	1
	97	3	-	-	-	-	-	1	1	-	5	-	-	-	100	-	-	5
	02	6	-	-	1	-	-	-	-	-	7	-	-	-	140	-	-	7
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	-10%
'97	00%	00%	00%	+10%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	199	Dec:	-
	'97	180		-
	'02	200		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	6	-	-	-	-	-	-	-	-	6	-	-	-	120	4	5	6
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	6	1
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	1	-	-	-	-	-	1	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	-71%
'02	00%	00%	50%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	0	Dec:		0%
'97	140			0%
'02	40			50%

Pinus edulis

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Y	89	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	2	-	-	1	-	-	-	-	-	3	-	-	-	60			3
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80	-	-	4
	02	4	-	-	-	-	-	-	-	-	4	-	-	-	80	-	-	4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	+34%
'97	00%	00%	00%	+29%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	66	Dec:		-
'97	100			-
'02	140			-

Purshia tridentata

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Y	89	-	1	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	02	-	-	2	-	-	-	-	-	-	2	-	-	-	40			2
M	89	-	8	3	-	-	-	-	-	-	11	-	-	-	366	8	23	11
	97	6	13	17	3	-	-	-	-	-	38	-	1	-	780	18	38	39
	02	1	-	13	-	1	9	-	-	1	24	1	-	-	500	14	48	25
D	89	1	3	-	-	-	-	-	-	-	3	-	1	-	133			4
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	1	-	-	4	-	-	-	3	-	-	2	100			5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	75%	19%	06%	+37%
'97	31%	40%	02%	-24%
'02	03%	94%	06%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	532	Dec:		25%
'97	840			0%
'02	640			16%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Quercus gambelii																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	-	1	-	-	-	-	-	-	-	-	1	-	-	33			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	20	26	1
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20	31	17	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	100%	00%	00%	-39%
'97	00%	00%	00%	+ 0%
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	33	Dec:	-
	'97	20		-
	'02	20		-

Rhus trilobata																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	43	89	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	-
	'97	0		-
	'02	0		-